KESTEVEN AND SLEAFORD HIGH SCHOOL

Physical Education Scheme of Learning
Year 10 GCSE – Term 2

Intent – Rationale

Students will develop their understanding of the cardiac cycle. They will be able to explain how the cardiovascular system supports exercise and how the recovery process can be used to enhance performance. Students will apply their understanding and develop the ability to reflect on this.

Sequencing – what prior learning does this topic build upon?	Sequencing – what subsequent learning does this topic feed into?
Knowledge of the body through musculoskeletal system. **Core PE lessons – Year 7 onwards**	• Written NEA • Physical training
What are the links with other subjects in the curriculum?	**What are the links to SMSC, British Values and Careers?**
• Base the content here on what you already know but there will be time in future to liaise further as part of our collaborative work	• Use the coded help guides to complete this section
What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	**What are the opportunities for developing mathematical skills?**
• Please fill this in with your own suggestions alternatively the LRC team will provide some suggested titles/links	• Calculating heart rates and training zones • Percentages

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Physical Education Scheme of Learning
Year 10 GCSE – Term 2

Intent – Concepts

<table>
<tr><th colspan="2">What knowledge will students gain and what skills will they develop as a consequence of this topic?</th></tr>
<tr><td colspan="2"><u>Know</u>
Know the structure of the heart. Be able to label the pathway of blood effectively. Know how to plot a graph using the data provided. Know the key terms involved with measuring respiration. Know the definitions for aerobic and anaerobic exercise. Be able to identify characteristics of each. Understand the effects of anaerobic exercise and know how this differs from aerobic. Know the different time scales when exercise effects the body. Know where strengths and weaknesses lie in knowledge of topics and types of questions.

<u>Apply</u>
Reinforce knowledge of key terminology and components of the cardiorespiratory system. Apply understanding of exercise on blood to exercise examples. Understand the recovery process and apply key terms such as EPOC, Lactic Acid and Oxygen Debt. Be able to recall methods used to decrease recovery time. Develop understanding of different command words and know the expected content required. Be able to apply understanding to AO2 and AO3 questions, using sporting examples to support explanations.

<u>Extend</u>
Evaluate the effect of exercise on blood; it’s flow and pressure. Be able to analyse data and be able to evaluate what the data is telling you. Be able to analyse a spirometer trace. Use understanding to demonstrate knowledge in a variety of examination questions with differing command words. Explain when EPOC would occur. Analyse how anaerobic exercise and EPOC relate. Analyse the EPOC graph and explain the impact intensity changes have on recovery. Be able to evaluate the use of methods to decrease recovery time. Analyse the effects of exercise and explain how exercise over time effects the body. Evaluate own performance, set learning goals as a result of end of topic tests.</td></tr>
<tr><th>What subject specific language will be used and developed in this topic?</th><th>What opportunities are available for assessing the progress of students?</th></tr>
</table>

Aerobic
With oxygen. When exercise is not too fast and is steady, the heart can supply all the oxygen that the working muscles need.
Summarised as: glucose + oxygen → energy + carbon dioxide + water.

Alveoli
Air sacs in the lungs.

Anaerobic
Without oxygen. When exercise duration is short and at high intensity, the heart and lungs cannot supply blood and oxygen to muscles as fast as the respiring cells need them.
Summarised as: glucose → energy + lactic acid.

Backflow
The flowing backwards of blood. Valves in the veins prevent this from happening.

Blood pressure
The pressure that blood is under. Types of pressure:
- systolic - when the heart is contracting
- diastolic - when the heart is relaxed.

Cardiac cycle
The process of the heart going through the stages of systole and diastole (see Blood pressure) in the atria and ventricles (see Heart chambers).

Cardiac output
The amount of blood ejected from the heart in one minute or stroke volume x heart rate.

Delayed onset of muscle soreness (DOMS)
The pain felt in the muscles the day after exercise.

Embolism

- Be as specific as possible here. What will be assessed.?

Blockage of a blood vessel.

Excess post-exercise oxygen consumption (EPOC)

Sometimes referred to as oxygen debt (now an outdated term), EPOC refers to the amount of oxygen needed to recover after exercise. EPOC enables lactic acid to be converted to glucose, carbon dioxide and water (using oxygen). It explains why we continue to breathe deeply and quickly after exercise.

Expire

Breathe out.

Fatigue

Either physical or mental, fatigue is a feeling of extreme or severe tiredness due to a build-up of lactic acid or working for long periods of time.

Haemoglobin

The substance in the red blood cells which transports oxygen (as oxyhaemoglobin) and carbon dioxide.

Heart attack

It occurs when the flow of oxygen-rich blood to a section of heart muscle suddenly becomes blocked.

Heart chambers

They include the right and left atria and ventricles.

Heart rate

The number of times the heart beats (usually measured per minute).

Hypertension

High blood pressure in the arteries.

Hypertrophy

The enlargement of an organ or tissue from the increase in the size of its cells.

Inspire
Breathe in.

Maximal heart rate
Calculated by: 220-age

Qualitative
More of a subjective than an objective appraisal. Involving opinions relating to the quality of a performance rather than the quantity (eg score, placing, number).

Quantitative
A measurement which can be quantified as a number, eg time in seconds or goals scored. There is no opinion expressed (qualitative). It is a fact.

Recovery
Time required to repair the damage to the body caused by training or competition.

Residual volume
Volume of air left in the lungs after maximal expiration.

Spirometer trace
A measure of lung volumes, which includes:

- tidal volume – volume of air inspired or expired/exchanged per breath
- inspiratory reserve volume – the amount of air that could be breathed in after tidal volume
- expiratory reserve volume – the amount of air that could be breathed out after tidal volume
- residual volume – the amount of air left in the lungs after maximal expiration.

Stroke volume

The volume of blood pumped out of the heart by each ventricle during one contraction. **Target zone** The range within which athletes need to work for aerobic training to take place (60-80% of maximum heart rate). **Training thresholds** The actual boundaries of the target zone. **Viscosity** Thickening of the blood.	

Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
Cardiac cycle, volumes and mechanics physiology	Know the structure of the heart. Be able to label the pathway of blood effectively.	Evaluate the effect of exercise on blood; it's flow and pressure. Apply this understanding to exercise examples.	
Cardiac cycle and volumes (data)	Know how to plot a graph using the data provided	Be able to analyse the data. Be able to evaluate what the data is telling you	
Mechanics of breathing & Spirometer trace (data)	Know the key terms involved with measuring respiration	Be able to analyse a spirometer trace. Be able to	

		evaluate what the data is telling you	
Reinforcement of knowledge and application	Reinforce knowledge of key terminology and components of the cardiorespiratory system	Be able to apply understanding to AO2 and AO3 questions, using sporting examples to support explanations	
EOTT	Develop understanding of different command words and know the expected content required	Use understanding to demonstrate knowledge in a variety of examination questions with differing command words	
Aerobic/Anaerobic Terms	Know the definitions for aerobic and anaerobic exercise. Be able to identify characteristics of each.	Explain when EPOC would occur.	
Practical examples of Aerobic/Anaerobic exercise	Understand the effects of anaerobic exercise and know how this differs from aerobic.	Analyse how anaerobic exercise and EPOC relate.	
EPOC (data)	Understand the recovery process and apply key terms such as EPOC, Lactic Acid and Oxygen Debt	Analyse the EPOC graph and explain the impact intensity changes have on recovery	

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Recovery	Be able to recall methods used to decrease recovery time	Be able to evaluate the use of methods to decrease recovery time	
Effects of exercise	Know the different time scales when exercise effects the body	Analyse the effects of exercise and explain how exercise over time effects the body	
Reinforcement of knowledge and application Musculoskeletal	Recall and reinforce knowledge of key terminology and components of the body systems	Be able to apply understanding to AO2 and AO3 questions, using sporting examples to support explanations	
EOTT	Develop understanding of different command words and know the expected content required	Use understanding to demonstrate knowledge in a variety of examination questions with differing command words	
Reflection	Know where strengths and weaknesses lie in knowledge of topics and types of questions	Evaluate own performance, set learning goals as a result of end of topic tests.	